

WHAT IS CLAIMED IS:

1                   1.       A method for compiling a design for an integrated circuit, the method  
2 comprising:  
3                   automatically performing multiple compilations of the design using a series of  
4 values for each input parameter in a set of input parameters to generate output values for one  
5 or more output metrics;  
6                   reporting the output values for the output metrics; and  
7                   concluding the compilations when a stopping criteria has been reached.

1                   2.       The method according to claim 1 wherein:  
2                   the method produces a table of results of the output metrics for each  
3 combination of input parameters used for a compilation.

1                   3.       The method according to claim 1 wherein:  
2                   the method produces a signature of the best configuration of input parameters,  
3 for use in future compilations.

1                   4.       The method according to claim 1 wherein:  
2                   the method produces a metric of average results across a range of input  
3 parameters to indicate expected noise or variability.

1                   5.       The method according to claim 4 wherein:  
2                   the metric is used to distinguish gains due to the input parameters from  
3 random fluctuation.

1                   6.       The method according to claim 1 wherein:  
2                   one of the input parameters is a random seed or initial configuration  
3 parameter.

1                   7.       The method according to claim 1 wherein:  
2                   one of the input parameters is effort level for the compilation tool or a portion  
3 of the compilation tool.

1                   8.       The method according to claim 1 wherein:  
2                   one of the input parameters modifies a default cost of a given resource for  
3 placement.

- 1                    9.        The method according to claim 1 wherein:  
2                    one of the input parameters modifies a default soft-limit for fitting or  
3 synthesis.
- 1                    10.     The method according to claim 1 wherein:  
2                    one of the input parameters modifies a coefficient indicating the speed versus  
3 resource usage optimization for the compilations.
- 1                    11.     The method according to claim 1 wherein:  
2                    one of the input parameters defines a level of effort to a register packing  
3 algorithm that combines circuit elements in the design into fewer logic elements on the  
4 integrated circuit when enabled.
- 1                    12.     The method according to claim 1 wherein:  
2                    one of the input parameters is a balancing parameter to technology mapping in  
3 synthesis.
- 1                    13.     The method according to claim 1 wherein:  
2                    one of the input parameters adds or deletes one optimization algorithm or step  
3 from a default CAD flow, or modifies an order in which CAD steps are applied to the  
4 integrated circuit.
- 1                    14.     The method according to claim 1 wherein:  
2                    one of the input parameters is a choice or specification of an alternate  
3 synthesis optimization script.
- 1                    15.     The method according to claim 1 wherein:  
2                    one of the input parameters enables a netlist optimization or physical  
3 resynthesis step.
- 1                    16.     The method according to claim 1 wherein:  
2                    the set of output metrics include a measure of the longest delay path in the  
3 design.
- 1                    17.     The method according to claim 1 wherein:

the set of output metrics includes a quantification of logic area or other resource usage of the integrated circuit.

18. The method according to claim 1 wherein:

the set of output metrics includes an estimate of power consumption.

19. The method according to claim 1 wherein:

the set of output metrics includes a metric for a number of paths, register-register pairs, IO-register pairs, or register-IO pairs that fail to meet a specified timing constraint.

20. The method according to claim 1 wherein:

the set of output metrics includes a minimum slack calculated on the integrated circuit.

21. The method according to claim 1 wherein:

the set of output metrics includes a total slack calculated on the integrated circuit.

22. The method according to claim 1 wherein:

the stopping criteria for the method is based on exhausting all possible combination of specified input parameters independent of results.

23. The method according to claim 1 wherein:

the stopping criteria is based on achieving a user's specified constraints.

24. The method according to claim 1 wherein:

the stopping criteria is a total compile time consumed over all of the compilations thus far.

25. The method according to claim 1 wherein:

the stopping criteria is based on a number of failed constraints in the integrated circuit.

26. The method according to claim 1 wherein:

the stopping criteria for the method is based on the number of failing timing paths in the circuit.

27. The method according to claim 1 wherein:

the stopping criteria is based on achieving a minimum worst-case slack in the integrated circuit.

28. The method according to claim 1 wherein:  
the stopping criteria is based on a total slack in the circuit.

29. The method according to claim 1 wherein:  
the stopping criteria is based on a statistical calculation of possible success by the method.

30. The method according to claim 1 wherein:  
an order of configurations tested is a static schedule pre-calculated by a tool.

31. The method according to claim 1 wherein:  
the order of configurations is dynamically modified based on a metric of current distance from the user goals.

32. A computer system for automating compilation of a design for an integrated circuit, the method comprising:  
code for automatically performing multiple compilations of the design using a series of values for each input parameter in a set of input parameters to generate output values for one or more output metrics;  
code for reporting the output values of the output metrics; and  
code for concluding when a stopping criteria has been reached.

33. The computer system according to claim 32 wherein the code for reporting the output values further comprises:  
code for producing a table of results of the output metrics for each combination of input parameters used for a compilation.

34. The computer system according to claim 32 further comprising:  
code for producing a signature of the best configuration of input parameters, for use in future compilations.

35. The computer system according to claim 32 further comprising:  
code for producing a metric of average results across a range of input parameters to indicate expected noise or variability.

1                    36.     The computer system according to claim 35 wherein the metric is used  
2 to distinguish gains due to the input parameters from random fluctuation.

1                    37.     The method according to claim 32 wherein:  
2                    one of the input parameters is a random seed or initial configuration  
3 parameter.

1                    38.     The method according to claim 32 wherein:  
2                    one of the input parameters is effort level for the compilation tool or a portion  
3 of the compilation tool.

1                    39.     The method according to claim 32 wherein:  
2                    one of the input parameters modifies a default cost of a given resource for  
3 placement.

1                    40.     A method for determining tuning parameters for a CAD algorithm or  
2 tool, the method comprising:  
3                    performing multiple compilations of a design of an integrated circuit using a  
4 series of values for each tuning parameter in a set of tuning parameters;  
5                    performing multiple compilations of the design using a series of exogenous  
6 parameters;  
7                    generating outputs values for one or more output metrics;  
8                    reporting the output values of the output metrics; and  
9                    concluding efficacy of the tuning parameters in the presence of exogenous  
10 noise.